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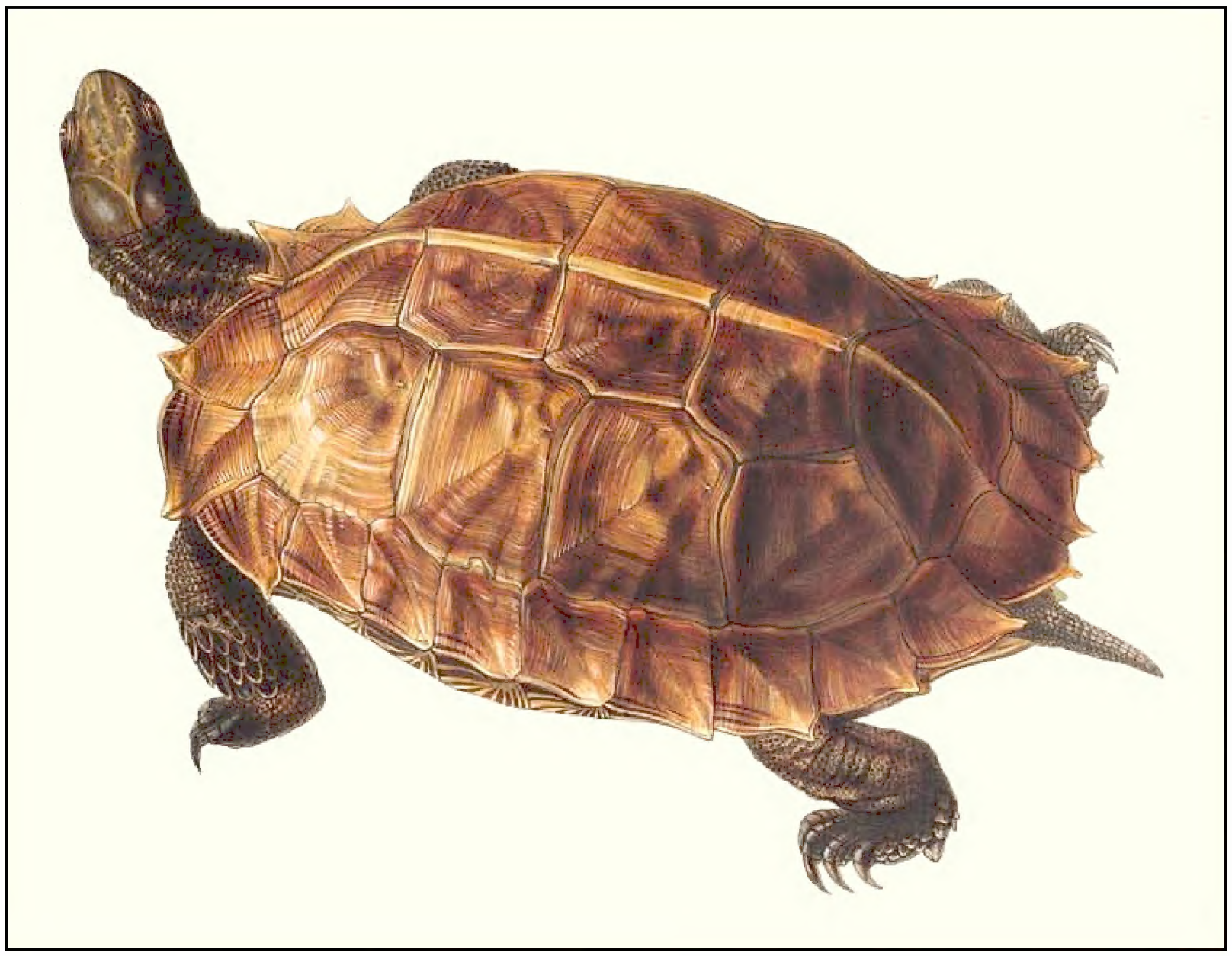

BULLETIN OF THE CHICAGO HERPETOLOGICAL SOCIETY
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Miscellanea Herpetologica Gabonica XII

Olivier S. G. Pauwels [1], Jean-François Gillet [2], Yannick G. Ongonwou Sonnet [3] and Laurent Chirio [4]

Abstract

We present new Gabonese locality records, ecological and morphological data or unpublished material for *Pelusios gabonensis* (Pelomedusidae), *Kinixys erosa* (Testudinidae), *Cycloderma aubryi* (Trionychidae), *Osteolaemus tetraspis* (Crocodylidae), *Hemidactylus richardsonii* (Gekkonidae), *Trachylepis affinis* and *T. maculilabris* (Scincidae), *Varanus ornatus* (Varanidae), *Dasypeltis confusa*, *Grayia ornata* (Colubridae), *Naja annulata annulata* and *N. melanoleuca* (Elapidae), *Boaedon virgatus*, *Gonionotophis guirali*, *Psammophis* cf. *phillipsii* (Lamprophiidae), *Python sebae* (Pythonidae), *Afrotyphlops congestus* (Typhlopidae) and *Atheris squamigera* (Viperidae). Three reptile species are newly recorded from each of Estuaire and Nyanga provinces. Two species are added to the list for Pongara National Park. We document a case of predation by *Psammophis* cf. *phillipsii* on *Trachylepis affinis*.

Keywords

Biodiversity, herpetofauna, reptiles, Crocodylia, Squamata, Testudines, conservation, protected areas, Gabon, Equatorial Africa.

Introduction

We pursue our series of miscellaneous contributions to the herpetology of Gabon (see Pauwels, Braun et al., 2017), in order to complete the gaps in the knowledge on natural history and geographical distribution of local reptiles, gathering observations made in the field. In the present volume, some new records by LC were made in the frame of environmental surveys for a Maboumine company project to exploit a polymetallic deposit in Moyen-Ogooué Province. Other new records by JFG were made in the course of a pilot project to help improve sustainable forest logging management in Gabon (Gillet, 2002).

Material and Methods

New photographic and voucher material was identified using the keys and morphological information provided by Pauwels and Vande weghe (2008). Examined voucher specimens are preserved in 70% ethanol. Paired meristic characters are given left/right. Abbreviations: Dept = Department; IUCN = International Union for Conservation of Nature, Gland; MNHN; Museum National d'Histoire Naturelle, Paris, France; NP = National Park; Prov. = Province; RBINS = Royal Belgian Institute of Natural Sciences, Brussels, Belgium; RMCA = Royal Museum for Central Africa, Tervuren, Belgium.

Results

Testudines

Pelomedusidae

Pelusios gabonensis (Duméril, 1856)

The label of a young individual RMCA 87-37-R-2 collected on 15 February 1987 by J. Borny mentions, in Dutch, "*kleine stuwmeertjes op bronnen achter de hutten v/ Loa-Loa, nabij Makokou* [small reservoirs at springs behind the huts of Loa-Loa, near Makokou], Gabon, 0°27'N - 12°48'E" (field nr MKU 45). Its brown, flat carapace shows a maximum width of 55.2 mm, a maximum length of 64.4 mm and a contrasting black vertebral band; the anterior lobe of the plastron is longer than twice the length of the abdominal scales; the three central vertebral scales are wider than long; the upper surface of the head shows a Y-shaped black mark. The species had previously been cited from Loa-Loa by Knoepffler (1974). Figure 1 shows an adult individual photographed by JFG in Nké forest river (0°08.4'N, 11°54.9'N) near Biliba, Mvoung Dept, Ogooué-Ivindo Prov. Its three central vertebral scales are wider than long. Another photograph, not presented here, shows the typical

Figure 1. Adult *Pelusios gabonensis* along Nké forest river near Biliba, Ogooué-Ivindo Prov., central Gabon. Photograph by J.-F. Gillet.

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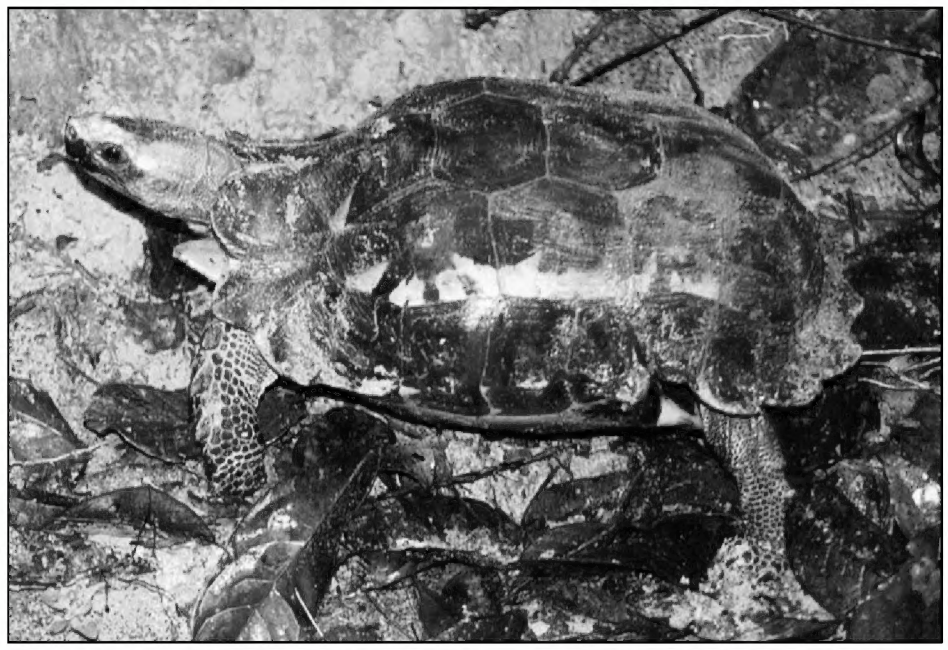

Figure 2. Adult *Kinixys erosa* in a logging concession in Mougoutsi Dept, Nyanga Prov., southwestern Gabon. Photograph by J.-F. Gillet.

Y-shaped mark on the dorsal surface of its head. New locality record within the dept (Maran and Pauwels, 2005).

Testudinidae
Kinixys erosa (Schweigger, 1812)
In July 2002 JFG photographed an adult individual in evergreen dense submontane forest in the UFA (= *Unité Forestière d'Aménagement* [Forestry Management Unit]) Mayumba (formerly of CBG [= *Compagnie des Bois du Gabon*]) logging concession (3°15'39.6"S, 11°06'21.6"E), Mougoutsi Dept, Nyanga Prov. (Figure 2). New locality record within the dept (Maran and Pauwels, 2005).

Trionychidae
Cycloderma aubryi (Duméril, 1856)
On 4 August 2006, one of us (YGOS) photographed an adult individual on the beach at Pointe Denis, Komo-Océan Dept, Estuaire Prov. (Figure 3). The species had never been recorded from Pongara NP (Pauwels, 2016). The listing of this turtle species from an additional protected area is especially important since the recent evaluation of the species as Vulnerable by the IUCN (Chirio et al., 2017). Within the dept the closest locality from where the species was so far recorded was Nyonié (Pauwels, Albert et al., 2017). On 30 December 2017 LC observed a juvenile individual in a slow-flowing and muddy stream (0°18'11.5"N, 10°15'52.8"E; alt. 3 m asl), tributary of the Komo River and close to their confluence, Komo Dept, Estuaire Prov. New locality record. Within the dept, the species had already been recorded from the Komo River in Kango (Maran and Pauwels, 2005). This new locality lies about 10 km S-SW from Andok Foula and the southwesternmost limit of the Mbé Sector of Crystal Mounts NP from where this turtle species has not been recorded so far (Pauwels, 2016).

Figure 3. Live adult *Cycloderma aubryi* on the beach at Pointe Denis, Estuaire Prov., northwestern Gabon. Photograph by Y. G. Ongonwou Sonnet.

Crocodylia
Crocodylidae
Osteolaemus tetraspis Cope, 1861
Figure 4 shows a juvenile individual caught by fishermen in July 2001 in Nké River (0°35.4'N, 11°57.7'E), a small forest river near Biliba, Mvoung Dept, Ogooué-Ivindo Prov. Figure 5 depicts four live adult individuals in the back of a pick-up vehicle; they were hunted for food in the same surroundings. New dept record (Pauwels and Vande weghe, 2008). During the night of 26 December 2017, LC observed 27 individuals in a slow-flowing, shallow stream (0°29'45.4"N, 10°37'47.7"E; alt. 430 m asl) in Komo Dept, Estuaire Prov.; one of them is shown on Figure 6. New locality record within the dept and the Crystal Mounts (Pauwels, Chirio et al., 2017). We follow Eaton et al. (2009) in treating *Osteolaemus tetraspis* as a species distinct from *O. osborni* (Schmidt, 1919).

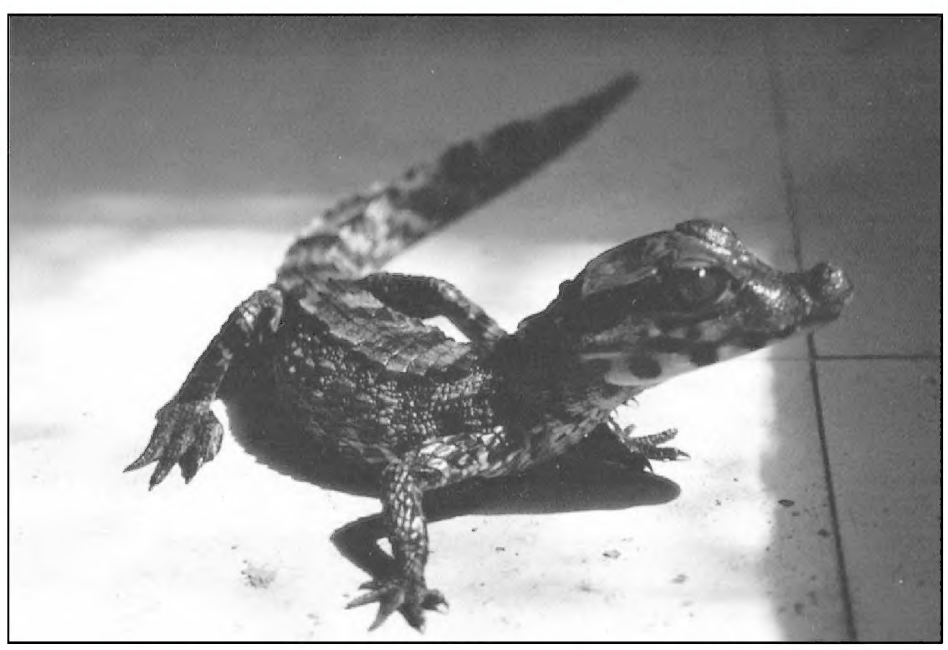

Figure 4. Live juvenile *Osteolaemus tetraspis* caught by fishermen in Nké River near Biliba, Ogooué-Ivindo Prov., central Gabon. Photograph by J.-F. Gillet.

Figure 5. Four live adult *Osteolaemus tetraspis*, hunted and captured for food near Biliba, Ogooué-Ivindo Prov., central Gabon. Photograph by J.-F. Gillet. Note the artisanal strings used to tie the limbs.

Figure 6. Live adult *Osteolaemus tetraspis* in the Crystal Mounts, Estuaire Prov., northwestern Gabon. Photograph by L. Chirio.

Squamata
Gekkonidae
Hemidactylus richardsonii (Gray, 1845)
Figure 7 illustrates an adult individual photographed by JFG in August 2000 along a house window in UFA Mboumi (formerly a SHM [*Société de la Haute Mondah*] concession) logging camp, Mboumi (0°23.7'S, 10°49.0'E), Abanga-Bigné Dept, Moyen-Ogooué Prov. New dept record. This uncommon gecko has been recorded only in a few localities in Gabon (Pauwels and Vande weghe, 2008; Pauwels, 2017).

Scincidae
Trachylepis affinis (Gray, 1839)
See below under *Psammophis* cf. *phillipsii* (Lamprophiidae).

Trachylepis maculilabris (Gray, 1845)
Ceríaco et al. (2016:313) listed voucher specimens housed in the MNHN from "Makokou," "Denis" and "Majumba." For "Denis" they gave the geographical coordinates "N: 0.31694, E: 9.36694, WGS-84", which corresponds to Pointe Denis (0°19'01.0"N 9°22'01.0"E), in Pongara NP, Komo-Océan Dept, Estuaire Prov. This skink had never been recorded from this park nor from this province (Pauwels, 2016). Their record from "Majumba" (Mayumba, in Haute-Banio Dept) represents an addition for Nyanga Prov. (Pauwels, Carlino et al., 2017). This skink is thus currently recorded from Estuaire, Haut-Ogooué, Ogooué-Ivindo, Ogooué-Maritime, Nyanga and Woleu-Ntem provinces; it should also be found in the savanna areas of Ngounié Prov.

Varanidae
Varanus ornatus (Daudin, 1803)
McKinnon et al. (2016: 267) published a color photo of a subadult 'varan' ('monitor') being cut as bushmeat in the market of Gamba, Ndougou Dept, Ogooué-Maritime Prov. The dead individual shows five transversal rows of yellow ocellae between limb insertions and a yellowish tongue, and can thus be identified as a *Varanus ornatus*. The species is already well known from Gamba (Pauwels, Burger et al., 2006; Pauwels, 2007).

Colubridae
Dasypeltis confusa Trape & Mané, 2006
Chirio (2017:52) presented a photograph of an adult individual

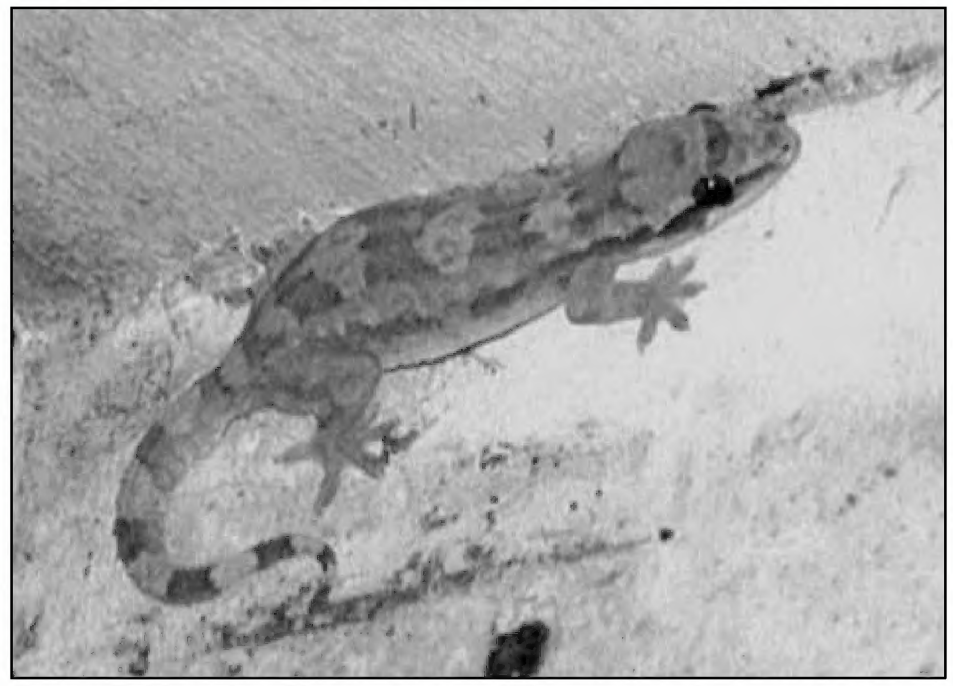

Figure 7. Live adult *Hemidactylus richardsonii* on a house in Mboumi, Moyen-Ogooué Prov., central Gabon. Photograph by J.-F. Gillet.

swallowing an egg in a henhouse, without specifying the locality. It was actually encountered in the Siat Nyanga Ranch (ca. 3°19'37.9"S, 11°42'42.5"E; alt. 90 m asl), Mougoutsi Dept, Nyanga Prov. (Chirio, unpubl. data). New prov. record for the genus (Pauwels and Vande weghe, 2008). From this ranch we had earlier reported predation cases by pythons on calves (Pauwels, Chirio et al., 2017).

Grayia ornata (Barboza du Bocage, 1866)
In July 2001 JFG photographed an adult individual which had been caught by net by villagers in the Nké River (0°08.4'N, 11°54.9'E) a small forest river near Biliba, Mvoung Dept, Ogooué-Ivindo Prov. (Figure 8). New dept record (Pauwels and Vande weghe, 2008). The photograph of an adult individual was published by Chirio (2017:50) without locality; it was in fact found in Mabounié, 40 km ESE of Lambaréné, Ogooué & Lacs Dept, Moyen-Ogooué Prov. (Chirio, unpubl. data). New locality record (Pauwels, 2017; Pauwels, Albert et al., 2017; Pauwels, Braun et al., 2017).

Elapidae
Naja annulata annulata Buchholz & Peters in Peters, 1876
Only the head of the adult individual RMCA 11-090-R-0003, killed by fishermen in July or August 2001 in "Environs de Mboumi [neighborhood of Mboumi], Gabon," could be preserved. Mboumi (0°23.7'S, 10°49.0'E) is located in Abanga-Bigné Dept, Moyen-Ogooué Prov. The head shows a maximum

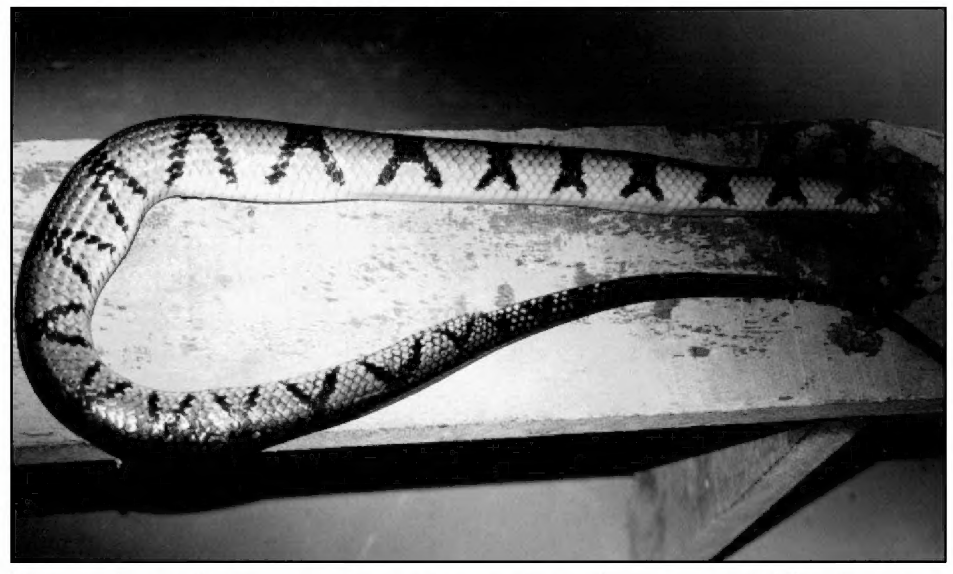

Figure 8. Adult *Grayia ornata* drowned in a fishing net in Nké forest river near Biliba, Ogooué-Ivindo Prov., central Gabon. Photograph by J.-F. Gillet.

Figure 9. Freshly dead adult *Naja annulata annulata* along Toho forest river, Ogooué-Ivindo Prov., central Gabon. Photograph by J.-F. Gillet.

width of 39 mm; round pupils; 7/7 supralabials, of which the 3rd and 4th contact the orbit; 8/8 infralabials, of which the first four are in contact with the anterior pair of sublinguals on each side; 0/0 loreal scales; 1/1 preoculars; 2/2 postoculars and 1/1 anterior temporals. New locality record (Pauwels, 2017; Pauwels, Albert et al., 2017). Figure 9 shows an adult individual photographed in July 2001 by JFG in Toho forest river (0°28.2'N, 12°05.5'E), Mvoung Dept, Ogooué-Ivindo Prov., which had been found drowned in a fishing net. New dept record (Pauwels and Vande weghe, 2008).

Naja melanoleuca Hallowell, 1857
Figure 10 illustrates an adult individual encountered on 29 December 2017 by LC in Ngoulmendjim (0°19'39.0"N, 10°16'55.5"E; alt. 84 m asl), Komo Dept, Estuaire Prov. New locality record (Pauwels and Vande weghe, 2008; Pauwels, Biyogho Bi Essono II et al., 2017).

Lamprophiidae
Boaedon virgatus (Hallowell, 1856)
The photograph of an adult individual was presented by Chirio (2017:52) without locality. This specimen was in fact photographed in Ayémé Maritime (0°18'47.8"N, 9°40'33.1"E; alt. 18 m asl), Komo-Mondah Dept, Estuaire Prov. (Chirio, unpubl. data). This represents a new prov. record for this poorly known snake which has been encountered only a few times in Gabon (Pauwels and Vande weghe, 2008).

Gonionotophis guirali (Mocquard, 1887)
The photograph of an adult individual was shown in Chirio (2017:51) without locality. It was actually taken in Mabounié, 40 km ESE of Lambaréné, Ogooué & Lacs Dept, Moyen-Ogooué Prov. (Chirio, unpubl. data). New locality record (Pauwels and Vande weghe, 2008 [under *Mehelya guirali*]; Pauwels, 2017).

Psammophis cf. *phillipsii* (Hallowell, 1844)
On 9 June 2005 ecoguards of Mayumba NP photographed by day an adult individual just above the beach (3°34'00.4"S, 10°48'48.5"E) between the Atlantic Ocean and Banio Lagoon, Haute-Banio Dept, Nyanga Prov. It was eating an adult *Trachylepis affinis* (Figure 11). This prey record confirms once again the dietary eclecticism of this snake, whose documented prey items in the wild in Gabon include species as diverse as the frogs *Hyperolius phantasticus* (Hyperoliidae) and *Phrynobatrachus auritus* (Phrynobatrachidae), the lizards *Agama*

Figure 10. Live adult *Naja melanoleuca* in Ngoulmendjim, Estuaire Prov., northwestern Gabon. Photograph by L. Chirio.

picticauda (Agamidae), *Gerrhosaurus nigrolineatus* (Gerrhosauridae) and *Hemidactylus mabouia* (Gekkonidae) and the bird *Merops breweri* (Meropidae) (Pauwels, Branch et al., 2004; Schmidt and Branch, 2005; Pauwels and David, 2008a; Pauwels and Vande weghe, 2008; Pauwels, Le Garff et al., 2016; Pauwels, Biyogho Bi Essono II et al., 2017). In addition, a captive newborn specimen caught in Gamba, Ogooué-Maritime Prov., accepted *Hyperolius adspersus* collected in the same locality (Pauwels and David, 2008b, citing *H. adspersus* under *H. nasutus*). In Gabon, this snake is found in savannas as well as on coastal grasslands; it was recently recorded from the beach area in Nyonié in Estuaire Prov. (Pauwels, Albert et al., 2017).

Pythonidae
Python sebae (Gmelin, 1789)
On 28 June 2017 JFG photographed from a bridge (0°44'48.1"S, 12°59'58.2"E) on R19 Road an adult individual swimming by day in shallow water (less than 20 cm depth) in Moumba River, Mouloundou Dept, Ogooué-Lolo Prov. New dept record (Pauwels and Vande weghe, 2008; Pauwels, Le Garff et al., 2016; Pauwels, Carlino et al., 2017).

Typhlopidae
Afrotyphlops congestus (Duméril & Bibron, 1844)
RBINS 16623: Ndouanieng (= Douaniang) (0°18'08"N, 10°01'31"E; alt. 26 m asl), on N1 Road, Komo Dept, Estuaire

Figure 11. Live adult *Psammophis* cf. *phillipsii* preying upon an adult *Trachylepis affinis* in Mayumba NP, Nyanga Prov., southwestern Gabon. Photographer unknown.

Figure 12. Live adult *Atheris squamigera* in a logging concession in Mougoutsi Dept, Nyanga Prov., southwestern Gabon. Photograph by J.-F. Gillet.

Prov., 15 November 2001. Snout–vent length 492 mm; tail length 14 mm; 31 scale rows around body at one head length behind head, 27 rows at midbody, and 22 rows at one head length before vent; all scales smooth and glossy. Observed by OSGP when it was intentionally killed by a car while it was attempting to cross the road through secondary forest at 4.15 P.M. Adult male, preserved with everted hemipenes. New prov. record (Pauwels and Vande weghe, 2008; Pauwels, 2016, 2017; Pauwels, Carlino et al., 2016).

Viperidae
Atheris squamigera (Hallowell, 1856)
An adult individual was found by JFG on a shrub in dense evergreen submontane forest (3°08'31.2"S, 10°58'12.0"E) in the *UFA Mayumba* logging concession, Mougoutsi Dept, Nyanga Prov. It was then brought to the ground and photographed (Figure 12). New prov. record (Pauwels, Le Garff et al., 2016; Pauwels, Carlino et al., 2017; Pauwels, Chirio et al., 2017). Nyanga was the last Gabonese province from which this common, arboreal viper had not yet been recorded.

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An Update on the Snakes of Snake Road: Additionally-detected Species and a Comparison of Spring and Autumn Observations

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Abstract

Snake Road, Shawnee National Forest, Union County, Illinois, is a well-known destination for snake enthusiasts hoping to witness biannual snake migrations to and from hibernacula. The road is closed to vehicular traffic for two months in spring and autumn to provide snakes safe passage across the road. In a prior summary of snake observations at Snake Road, I acknowledged an autumn-visitation bias. To compensate for this bias, I revisited the area placing an emphasis on spring. From spring 1996 through spring 2018, I walked Snake Road and vicinity for a total of 467 hours, equally divided between spring and autumn. I recorded a total of 2,440 observations of snakes of 22 species, encountering more individuals in autumn but more species in spring.

Introduction

At higher latitudes and altitudes, temperate-zone snakes shelter below the frost line during winter months to avoid freezing and desiccation (Gregory, 1982; Costanzo, 1989). Snakes may overwinter within the bounds of their active season or move to distant hibernacula. Movement away from hibernacula occurs as winter transitions to spring and movement towards hibernacula occurs as summer transitions to autumn (Gregory, 1982). These movements may result in observable peaks in snake activity in spring and autumn (Gibbons and Semlitsch, 1987).

Snake migration to and from hibernacula is a well-known, biannual event at LaRue-Pine Hills/Otter Pond Research Natural Area, Shawnee National Forest, Union County, Illinois (Schons, 2011; Anonymous 2017; Krey, 2018). Each spring and autumn, large numbers of snakes cross U.S. Forest Service Road 345, between limestone-bluff hibernacula and LaRue Swamp and associated lowlands. The road, closed to vehicular traffic for two months in spring and autumn, is locally known as Snake Road. In a previous summary of my observations of snakes at Snake Road, I acknowledged an autumn-visitation bias (Palis, 2016). Since that summary, I re-focused my efforts, placing a greater emphasis on springtime in order to equalize time spent on site in spring and autumn. My goal in equalizing spring and autumn effort was to facilitate a comparison of numbers of snakes and snake species observed during these seasons.

Methods

Methodology followed Palis (2016). As before, I visually observed snakes on and near Snake Road, and along the base of the bluff. Beginning in 2017, I occasionally ventured further west out into the swamp and further east into valleys and onto hillsides. Moreover, in addition to observing surface-active snakes, I occasionally turned or lifted—and then carefully replaced—natural cover objects such as small rocks and logs. Minimizing disturbance by replacing cover objects to their original position is extremely important to the cryptic fauna that rely on them for shelter. I kept track of the amount of time I spent on site so I could calculate the rate at which I encountered snakes. Although I recorded observations of snakes that eluded identification by fleeing or concealing themselves deeply within rock crevices, I do not include these in this update or in calculation of snake observation rates.

In this seasonal comparison of snakes, I combine spring and autumn detections included in Palis (2016), with those made in spring 2016, 2017 and 2018, and autumn 2016 and 2017. I define "spring" as March through May (I was on site as early as March 4 and as late as May 30) and "autumn" as September through November (I visited as early as September 1 and as late as November 27). During this spring 1996 through spring 2018 investigation, I was on site for a total of 467 hours, equally divided between spring and autumn. I achieved parity between seasons on 2 May 2018.

Results and Discussion

I recorded a total of 2,440 observations of snakes of 22 species (Table 1), for an overall detection rate of 5.2 snakes per hour. I observed more snakes in autumn (N = 1402) than spring (N = 1038), but I detected more species of snakes in spring (N = 22) than autumn (N = 18). In autumn, I detected an average of 6 snakes per hour, whereas in spring I detected a mean of 4.4 snakes per hour.

My greater success detecting snakes in autumn is counter-intuitive as autumn vegetative cover exceeds that of spring. Greater snake detection in autumn may be related to the temporal distribution of migrating snakes as they move to hibernacula. In autumn, snakes return to hibernacula over an extended period of time; whereas in spring large numbers of snakes may emerge from dens en masse coincident with the arrival of favorable weather. Although well-timed spring visits can yield numerous snake sightings (see below), poorly-timed visits can be unproductive (Seymour, 1966a, b). Due to the protracted nature of the autumn snake migration, autumn visits can be more productive over a greater duration.

Although overall snake detection was higher in autumn, I detected most microsnakes (Common Wormsnakes, Ring-

Table 1. Number of spring (March through May) and autumn (September through November) snake observations at Snake Road, Union County, Illinois, 1996–2018.

Species		Season		
Scientific name	**Common name**	**Spring**	**Autumn**	**Total**
Agkistrodon contortrix	Copperhead	9	17	26
Agkistrodon piscivorus	Cottonmouth	573	1034	1607
Carphophis amoenus	Common Wormsnake	10	0	10
Coluber constrictor	North American Racer	18	11	29
Crotalus horridus	Timber Rattlesnake	1	12	13
Diadophis punctatus	Ring-necked Snake	81	22	103
Farancia abacura	Red-bellied Mudsnake	1	2	3
Heterodon platirhinos	Eastern Hog-nosed Snake	1	0	1
Lampropeltis getula	Eastern Black Kingsnake	5	6	11
Lampropeltis triangulum	Milksnake	2	3	5
Nerodia cyclopion	Mississippi Green Watersnake	9	23	32
Nerodia erythrogaster	Plain-bellied Watersnake	85	91	176
Nerodia rhombifer	Diamond-backed Watersnake	1	0	1
Nerodia sipedon	Common Watersnake	1	0	1
Opheodrys aestivus	Rough Greensnake	12	30	42
Pantherophis spiloides	Gray Ratsnake	79	39	118
Storeria dekayi	Dekay's Brownsnake	32	39	71
Storeria occipitomaculata	Red-bellied Snake	23	8	31
Tantilla gracilis	Flat-headed snake	17	1	18
Thamnophis proximus	Western Ribbonsnake	45	52	97
Thamnophis sirtalis	Common Gartersnake	14	5	19
Virginia valeriae	Smooth Earthsnake	19	7	26
Number of snake observations		1038	1402	2440
Number of snake species		22	18	22
Number of survey hours		233.5	233.5	467

necked Snakes, Red-bellied Snakes, Flat-headed Snakes, and Smooth Earthsnakes) more commonly in spring (Table 1). Improved detection of microsnakes in spring may be related to greater soil moisture in that season (Hollinger and Isard, 1994). Microsnakes are more likely to be found near the surface when soil moisture is high (Force, 1935; Ernst and Ernst, 2003; Orr, 2006). DeKay's Brownsnakes are the exception as I encountered them with near-equal frequency in both seasons. With the inclusion of more spring observations, Ring-necked Snakes now rank as the most-frequently encountered microsnake, replacing Dekay's Brownsnake (Palis 2016).

My most productive snake days occurred in recent years and I enjoyed two particularly fruitful days in spring. On 24 March 2017, I observed 111 snakes including 88 Cottonmouths, one North American Racer, one Eastern Black Kingsnake, four Plain-bellied Watersnakes, 16 Gray Ratsnakes, and one Western Ribbonsnake. On 12 April 2018, I detected 13 species of snakes including Copperheads, Cottonmouths, North American Racers, Ring-necked Snakes, Eastern Black Kingsnakes, Plain-bellied Watersnakes, Diamond-backed Watersnakes, Gray Ratsnakes, Dekay's Brownsnakes, Red-bellied Snakes, Western Ribbonsnakes, Eastern Gartersnakes, and Smooth Earthsnakes. In autumn, my best snake days occurred in October 2015 when I observed ten species of snakes on the 12th (Copperheads, Cottonmouths, North American Racers, Ring-necked Snakes, Green Watersnakes, Plain-bellied Watersnakes, Rough Greensnakes, Gray Ratsnakes, Dekay's Brownsnakes, and Western Ribbonsnakes) and 75 individuals on the 22nd (57 Cottonmouths, one Timber Rattlesnake, one Eastern Black Kingsnake, four Plain-bellied Watersnakes, five Gray Ratsnakes, two Dekay's Brownsnakes, one Red-bellied Snake, and four Western Ribbonsnakes.

I detected five additional species of snakes since my last summary: Common Wormsnakes, Eastern Hog-nosed Snakes, Diamond-backed Watersnakes, Common Watersnakes, and Flat-headed Snakes. Fortuitous encounters with one Eastern Hog-nosed Snake, one Diamond-backed Watersnake, and one Common Watersnake can likely be attributed to spending more time on site, whereas observations of Common Wormsnakes and Flat-headed Snakes were likely the result of increased effort in spring and turning more cover objects.

The list of ten most frequently observed snake species differs

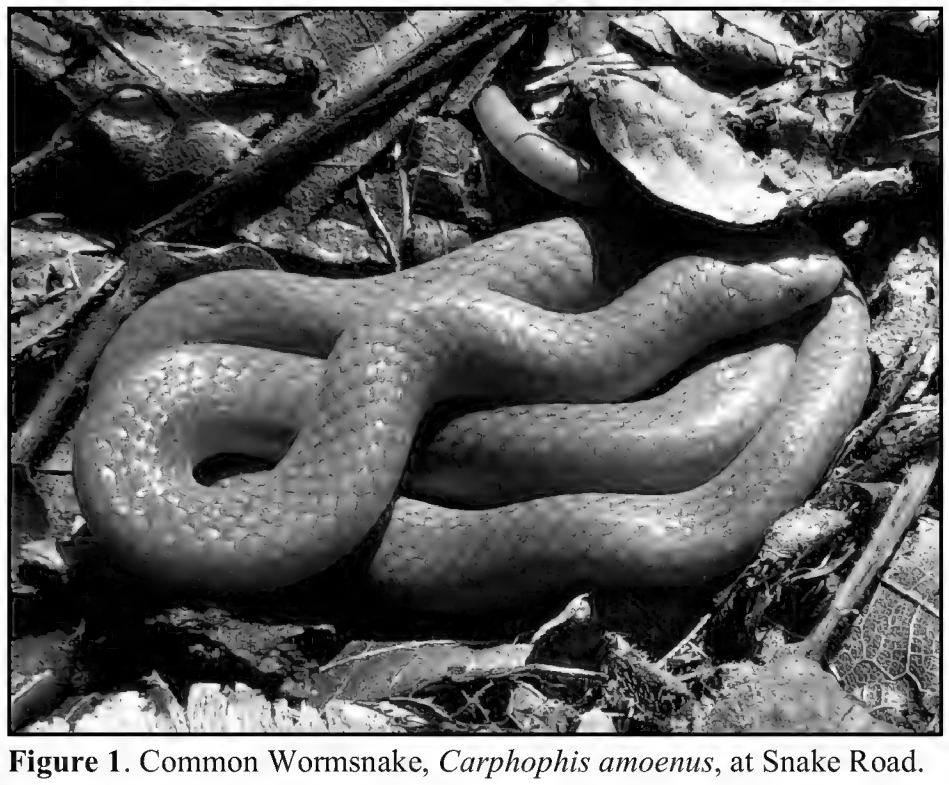

Figure 1. Common Wormsnake, *Carphophis amoenus*, at Snake Road.

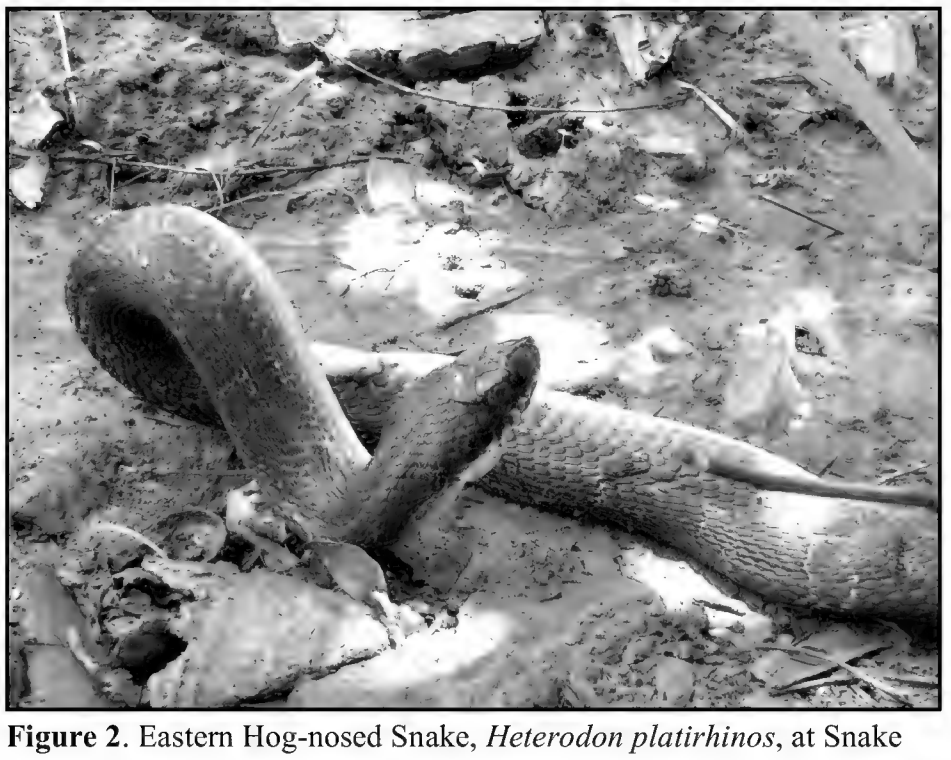

Figure 2. Eastern Hog-nosed Snake, *Heterodon platirhinos*, at Snake Road.

Figure 3. Diamond-backed Watersnake, *Nerodia rhombifer*, on Muddy Levee Road.

Figure 4. Common Watersnake, *Nerodia sipedon*, at Snake Road.

Figure 5. Flat-headed Snake, *Tantilla gracilis*, at Snake Road.

All photographs by the author

Table 2. Ten most frequently encountered snake species at Snake Road, Union County, Illinois, 1996–2015 (Palis 2016) and 1996–2018, listed in decreasing order of abundance.

Species (1996–2015)	Species (1996–2018)
Agkistrodon piscivorus	*Agkistrodon piscivorus*
Nerodia erythrogaster	*Nerodia erythrogaster*
Thamnophis proximus	*Pantherophis spiloides*
Storeria dekayi	*Diadophis punctatus*
Opheodrys aestivus	*Thamnophis proximus*
Pantherophis spiloides	*Storeria dekayi*
Diadophis punctatus	*Opheodrys aestivus*
Nerodia cyclopion	*Nerodia cyclopion*
Storeria occipitomaculata	*Storeria occipitomaculata*
Virginia valeriae	*Coluber constrictor*

between the current summary and my previous summary (Palis, 2016). Although Cottonmouths and Plain-bellied Watersnakes remain the two most frequently observed species, and Mississippi Green Watersnakes and Red-bellied Snakes still rank eighth and ninth, respectively, the addition of more spring observations has resulted in a reshuffling of intervening species (Table 2). Further, North American Racers have replaced Smooth Earthsnakes among the top ten species. These results may not only reflect differences in seasonal snake activity patterns, but may also reveal bias associated with visual encounter surveys. Among reptiles, snakes are among the most difficult taxa to detect and snake detectability is influenced by a myriad of factors such as response to environmental variables, species-specific activity patterns, body size, and cryptic coloration and behavior (Durso et al., 2011). Thus, snake observations summarized in Tables 1 and 2 provide an index of conspicuousness that likely varies with factors that influence snake activity and detection probability.

Snake Road provides a unique recreational opportunity for snake enthusiasts to observe up to 22 species of snakes within a relatively small area. The U.S. Forest Service is commended for concurrently providing snakes with safe passage and an exceptional recreational opportunity for visitors to Shawnee National Forest.

Acknowledgments

Erin Palmer, Jean Sellar, and Joshua Vossler were frequent Snake Road companions in recent years; I thank them for their camaraderie and their keen "snake eyes." Special thanks to Joshua Vossler for alerting me to the Snake Road Diamond-backed Watersnake and the springtime Timber Rattlesnake. I also had the pleasure of walking the road with members of the Chicago Herpetological Society, as well as other friends and acquaintances. I thank other Snake Road enthusiasts who generously pointed out snakes I might otherwise have missed.

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Diet of Captive Three-toed Box Turtles and the Potential to Distribute Seeds of American Ginseng

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The turtles

In the years 1999 and 2001 we acquired two female three-toed box turtles (*Terrapene carolina triunguis*) at a local pet store and were told at the time the turtles had been caught in Missouri. According to T. R. Johnson (2000), Missouri citizens often capture three-toed box turtles. This origin is likely more so because both turtles have a great fondness for cantaloupe (Dodd, 2001). We speculate that both may have been captured on one or two of several Missouri cantaloupe farms. Alternatively, they may also have been locally captured because many three-toed box turtles have been released across the state of Iowa (LeClere, 2013).

Both of us have utilized the turtles to help as demonstrations in science classes or in literature classes to illustrate fictional turtles presented in such works as John Steinbeck's *Grapes of Wrath* and Joseph Bruchac and Jonathan London's *Thirteen Moons on Turtle's Back: A Native American Year of Moons*.

General plant diet

We have over the past 18 years tried a few native and store-purchased domesticated plant items for these turtles. One of the first plant items offered that both turtles consumed was apple (*Malus domestica*). Since many apples in orchards may fall to the ground upon ripeness, it is conceivable that both turtles had access in the past to such an orchard.

Another plant for which box turtles are documented as consumers is Mayapple (*Podophyllum peltatum*) (Rust and Roth, 1981). Mayapple is a common component of deciduous woodlands in the Midwest and SJ has several clones growing in his yard in Iowa. While this provides easy access to and ready availability of fruits, neither turtle showed any curiosity toward them.

While in northeastern Kansas in the early 1990s, SJ observed ornate box turtles zealously eating wild strawberries (*Fragaria virginica*) and later found a turtle in a neighbor's flowerbed that responded very positively to cultivated strawberries. So, we thought that since strawberry is a fairly common component of Midwestern forest edge habitat and because Allard (1935) suggests they are part of the eastern box turtle's diet, perhaps these three-toed box turtles might enjoy them as well. Again, neither showed the slightest interest.

Another commonly available forest edge species may be any of several species of blueberry (*Vaccinium* sp.), but neither turtle partook of these. It may be that these rejections show some degree of food preferences formed in the earlier lives of these turtles.

There are also a few dietary distinctions between the turtles. While box turtle 2001 readily consumes store-purchased blackberries, box turtle 1999 shows no interest in them. Also, box turtle 2001 enjoys chunks of store-bought watermelon while box turtle 1999 again showed no affinity.

Both turtles commonly eat cantaloupe and various cultivars of lettuce. So, the plant diet in general seems to diverge from wild foods and instead embraces domesticated plants.

Then in 2015, SJ decided to introduce fruits of American ginseng (*Panax quinquefolius*) to the turtles. SJ purchased several American ginseng plants from an on-line nursery in 2010. All but one died, but the remaining one has flowered or attempted to flower every year. This plant produces sterile bright red fruits in mid-to-late summer. SJ noticed that often these bright red fruits fall to the ground within the reach of a box turtle so he collected several and presented them to the turtles. Box turtle 1999 showed no interest but immediately box turtle 2001 approached the fruits, placed her nose on one in the manner described in Dodd (2001), and proceeded to consume all of the fruits. SJ wanted to repeat this feeding trial the following year but in 2016 the ginseng stem was cropped most likely by a passing deer. In 2017 the aerial stem was broken and swept away by strong winds.

This recognition of and affinity for American ginseng fruits may indicate that box turtle 2001 had past experience with American ginseng. Since the range of American ginseng has considerable overlap with the range of the three-toed box turtle, it may be likely that in a natural forest setting that three-toed box turtles might distribute seeds of American ginseng.

American ginseng may receive long-distance dispersal by deer as does another forest understory herb, white trillium (*Trillium grandiflorum*) (Vellund et al., 2003), but among reptiles, box turtles are known seed dispersers and may retain seeds in their digestive tract for as long as 70 days (Stiles, 1989).

Box turtle 2001 consuming a ginseng fruit.

However, the fruit consumption of box turtle 2001 could also indicate that perhaps she may have had access to a ginseng farm and thus all the dietary preferences of these turtles were derived from an almost complete access to cultivated plant sources.

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Minutes of the CHS Board Meeting, April 20, 2018

Rich Crowley called the meeting to order at 7:44 P.M. Board members John Archer, Dan Bavirsha, Lawrence Huddleston, Zac Oomens and Jessica Wadleigh were absent. Minutes of the March 16 board meeting were read and accepted with changes.

Officers' Reports

Treasurer: In the absence of John Archer, Andy Malawy read through the financial reports.

Media secretary: Kim Klisiak plans to move the CHS website to a new host. A list of this year's grant awards is now up on the website. There is also a link to the CHS library database, which allows searching and browsing. Kim will be creating new business-card-size invitations to attend CHS meetings.

Membership secretary: Mike Dloogatch read the list of expiring memberships. Thanks to ReptileFest there was a net increase in members this month, including renewals from several former members.

Sergeant-at-arms: There were 40 in attendance at the March 28 meeting.

Committee Reports

ReptileFest: Frank Sladek did a great job. Frank praised John Archer as being a great mentor. Attendance was the second best ever, approximately 6,600. Online ticket sales through Eventbrite.com were well worth it—2,200 sold. The Geographic Society of Chicago was very pleased with their participation. High school volunteers did a great job as usual.

Adoptions: Linda Malawy reported that homes were found for most of the animals up for adoption at 'Fest.

Junior Herpers: Frank Sladek reported that attendance was about 40 at the April meeting, which dealt with how to handle reptiles safely at 'Fest. May meeting will be Show & Tell. A field trip is possible for June.

Old Business

Because of two unfornate incidents at shows over the past year, we have stepped up on protocol, including written incident reports, show guidelines and first-aid kits at shows.

New Business

Mike Dloogatch moved that the CHS reimburse Bob Bavirsha for any and all legal expenses arising from the incident this past January at the Chicagoland Fishing, Travel and Outdoor Expo. Mike Scott seconded. The motion passed unanimously.

The meeting adjourned at 10:00 P.M.

Respectfully submitted by recording secretary Gail Oomens

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Toad Stools: Insight into the Rococo Toad, *Rhinella schneideri*

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Prologue: For the past three decades I have visited and conducted research in Paraguay in South America. During my nearly annual trips to oversee a captive breeding program for Chacoan peccaries, *Catagonus wagneri*, I have had the opportunity to experience and explore other forms of wildlife in a unique and endangered habitat, the Chaco. What follows is taken directly from my field notes written in November of 2016 during a ten-day-long stay at *Proyecto Taguá*, the conservation site for this peccary's protection and propagation and the home of the Chaco Center for Conservation and Research [*Centro Chaqueño para la Conservación e Investigación* or CCCI <www.cccipy.org/en/>].

Last night I was again struck by the sheer number of droppings in and around the workshop, *lavanderia* and carport. I never thought about who or what was the provider of the multiplicity of dark-colored mounds. I knew it wasn't the baby brocket deer that was being hand raised, as the shape and amount was not right. During the early evening a very large and probably egg-laden female False Coral Snake crawled into the carport and, in the midst of taking photographs of her, I suddenly put two and two together when Juan said "she's probably looking for toads." It then dawned on me that the mounds spread throughout the outdoor area of the *estancia* belonged to toads, specifically to large toads or *sapos*, similar to those we saw in Panama all those many years ago.

So eventually the conversation shifted from snakes to toads and we asked each other if anyone had ever looked at toad stools to determine their diet. It was decided that the answer was probably not, either because it had not been thought of or because no one had this kind of opportunity before. In all my time here I had never thought of it but in my own defense I don't ever remember the sheer volume of droppings present this year. There are several seen and no doubt unseen *sapos* nightly patrolling the outdoor area in search of insects. They are usually strategically positioned under the outdoor lights where insects are attracted with the onset of dusk and dark. Several are the size of a Chicago softball, others half that size, and there are one or two that are among the biggest I have ever seen. With the onset of darkness the toads may be seen alone, or in loose association, seemingly focused on the next morsel and oblivious of a neighbor or two in close proximity. Last night in an unscientific survey I counted at least seven within easy view. Before I went to bed that night I wrote this message to myself for the morning "Toad Stools."

After breakfast I gathered the necessary collecting equipment for what we believed to be a first-time study of Paraguayan Rococo Toad stools! First, snap-top clear plastic vials to hold the samples, a pair of forceps, disposable gloves and I was off. In the end, I found it was easier just to scoop or push the samples into the vials with a gloved hand rather than using the forceps. I scavenged and before long had accumulated nearly two dozen intact samples, each a compact package of insect remains. I had never examined the droppings before and was amazed at the sheer volume of insects each contained. I had just collected several thousands of crawling flying creatures neatly packaged, courtesy of the toads.

The next step was to find some way to dry the samples as completely as possible for transport back to the university. In most cases this is accomplished with the aid of a small oven, called a drying oven, where samples can slowly desiccate without changing or destroying them. There was no drying oven here, small or otherwise! It was time to improvise. I needed some sort of semi-sturdy container to set the uncapped vials in, small enough to hold them upright but big enough to be sturdy. A small cardboard box or plastic container would do, but none was available. There was however a near empty cardboard box that holds packages of milk which can be stored at room temperature until opened. I rearranged the milk supply and soon had the use of a 12- by 6-inch cardboard tray which was domed in translucent plastic—the plastic tent that remained when the milk cartons were removed. After uncapping the vials, I neatly placed them side by side in my improvised drying oven and set them out on the metal cap of the cistern in full sunlight. Hot enough to dry but not hot enough to destroy. The ideal temperature for slow drying samples is about 105°F. Even heat, heat from the sun from the top and heat from the sheet metal from below. Open ends so moisture could escape from the plastic tent as well as excess heat. I wedged this invention of necessity along the cistern drain pipe and anchored it in place with two pieces of broken brick. The oven was bookended in place and turned on so long as the sun shone and that it did. At day's end I moved the entire "oven" inside the *estancia* for safekeeping.

The next morning I did my rounds and collected additional *sapo* samples to be added to the oven. These were significantly fewer in number but this time each had a number of known contents. That evening, Tuesday, the day Paraguay lost to Bolivia in *futball*, there was a flight of termites. Flights occur predictably after heavy rains and we had just had one. Millions of winged termites take flight seeking mates and gather at and around any light source where their numbers fill the air and obscure the light. In their nuptial dance, wings are lost and the insects again become ground dwellers, trailing after each other in a mad flurry of sexual activity. I watched one medium sized toad sit in a haze of flying and falling termites snapping up one after the other with barely more than a small bow forward. Bow, catch, crunch, swallow, and then repeat. As fast as one was caught and swallowed another was sought. The supply of food was, at least for the moment, seemingly never ending. In the morning the only trace of this extraordinary event were the hundreds of thousands of pairs of wings that littered any surface

under or near a light. It is necessary to close windows, seal doors and close curtains to keep the termites from flying into the house. Even with the best precautions, hundreds of wingless individuals find their way in through cracks and crevices.

Before this termite flight and associated *sapo* feeding frenzy I had thought to broaden my study of toad stools by catching some of the animals that I had seen around the *estancia*'s structures, to get some basic measurements such as body length and weight, and perhaps sex. But alas, it was not to be. Those toads I had seen the night before, the seven plus, were off somewhere else this night, also responding to the heavy rain with their own but slightly different nuptial flight. They had left their retreats around the buildings and moved toward and into the growing ponds filled and formed by the rain. There was but a single toad in the driveway under the light, a mad consumer of termites who I had not the heart to disturb. Later that night on the walk back to my own bed I spied another making its way along the path, a path that now led past two newly filled ponds, bodies of water vibrating with the sound of courting amphibians, frogs and toads of several species. Among this symphony of amphibian sound were my *sapos* from the estancia singing their own mating nuptial. Perhaps there will be a chance to gather basic *sapo* data another night.

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Flipping Pages: Appreciations of Herpetological Literature
Husbandry Books: The Times They Are a-Changin'

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Shortly after Thanksgiving 2017 I adopted or rescued—was given—an adult female Russian Tortoise. When the local wildlife center receives a herptile-related call, I am often the person the caller is referred to, so over the years I have convinced a forest preserve ranger that the snakes people were seeing at a waterfall were not Water Moccasins, told a home owner who recently purchased a multimillion dollar home in a very exclusive suburb what to do about the snake he found crawling around the foundation (Homeowner: "I have a problem. I have snakes on my property." Me: "So what's the problem?"), and have been given a Ball Python, an Asian Box Turtle, many North American Box Turtles, a Pancake Tortoise, and finally the Russian Tortoise mentioned at the beginning of this paragraph.

Usually when I receive a turtle call, it is for a Red-eared Slider, a species no one will take. When I surveyed herptiles in DuPage County in the 1980s and early '90s, I think I found sliders at one location, a retention pond in Wheaton (I was called there because the neighbors said they were seeing Water Moccasins—I know, I know). The last few years, though, I have seen sliders in three or four locations, the size range suggesting they are reproducing. I tell my slider caller to see if a local pet store will take it, which they seem to do. So when the caller said she had a Box Turtle she wanted to get rid of, I was excited. When I spoke to her again, she said it was a Russian Box Turtle. I became suspicious. When I actually saw it, it was a tortoise, and it later proved to be a Russian (Horsfield's) Tortoise.

I had a general idea of what the care requirements would be for a tortoise, and I was fortunately given the tortoise's enclosure, lights, etc. But I knew there was a lot more I needed to learn. When I went online to do some research, the keyword search "Russian tortoise care" resulted in 692,000 hits (I was momentarily distracted by "Russian women" popping up as soon as I entered "Russian"; I have been married 44 years and decided that was not a good road to go down). I also found several groups on Facebook and joined one. Ten or 15 minutes of work online and I had a wealth of information at my disposal.

It was a very different situation back in the late 1950s and early 1960s when I became interested in keeping reptiles. Then, the only reptile pets I had were the little green Red-eared Sliders that could be bought in department stores and dime stores (if you are unfamiliar with either one, go online and learn something). Housing for the turtles consisted of a shallow plastic bowl with a plastic palm tree, and the food that was sold for them was dried ant pupas. I don't remember any of the turtles that my parents bought for my brothers and me living more than a few weeks; had we bought one of the turtles whose shell had been painted, it might have died even sooner.

Then, in 1960, Tropical Fish Hobbyist, then publishing the definitive books on aquariums and aquarium fishes, published *Turtles as Pets* (subtitle: *A Guide to the Selection, Care, and Breeding of Land and Water Turtles*) by Mervin F. Roberts. Although I had many, many titles in the series that TFH published, this was the last one I kept, but—alas—when I searched for it, it was gone! I found a photograph of the cover: green, with a half dozen turtles, including a box turtle, on the cover. I probably should know the book's contents by heart, since I read

it scores of times. I do recall its mentioning a lump on a Box Turtle containing (as I have noted elsewhere) "the maggot of the bot fly." When my son started listening to Punk Rock, I decided "Maggots of the Bot Fly" would be a great name for a band.

The important thing, though, was that this booklet (24 pages) offered husbandry advice that was actually of some value. It discussed the correct diet for several species, as well as housing, cleanliness, suitability as a pet, and so on. There weren't that many other choices! Over the years TFH published a whole series of similar books dealing with frogs, anoles (*Chameleons as Pets*—we were told the small lizards lived on air!), iguanas, terrariums, and so on; I recall Roberts being credited as the author of most of them. These were sold in pet stores (another digression: has anyone else noticed pet stores don't seem to stock books on reptile care?), and they were usually the best things out there.

In 1959 or 1960, my parents gave me *The Golden Book of Wild Animal Pets* by Roy Pinney. A few years ago I donated my copy; the only copy I can find for sale at the moment is valued at $199.99, and I have not misplaced the decimal point. The book was large format, with many colored photographs, and it addressed a variety of species, including skunks, raccoons, flying squirrels, and armadillos. Very basic husbandry and caging information was given. When it came to amphibians and reptiles, natural vivariums were recommended. What I remember most about the snake section was a freckled, red-haired boy (it could have been Opie's twin) blowing on the neck of a garter snake with a caption to the effect that this was a good way to get a snake's attention. I don't know about that: I think many of the snakes I've handled would turn around and strike the handler's nose. But I also remember a photograph of a pair of brilliantly orange Corn Snakes, with the caption the snakes would "often breed in captivity." It was almost 40 years later until I owned and bred Corn Snakes, but that photo started it all. I do have another book by Pinney: *The Snake Book* (1981). This book covers a number of topics, including husbandry, but it is the first chapter consisting of biographical sketches of a number of herpetologists that continues to hold my interest.

Being a bookish child, I began to explore my local public library and used bookstores (the latter of which all seemed to be in sections of town my mother did not want me to go to). I discovered a number of books containing nuggets of husbandry information. For example, Raymond L. Ditmars's *The Reptiles of North America* (1907; 1936) says this about our native American Gopher Tortoises: "In captivity, the gopher tortoise is hardy and thrives for years if given the proper care. Captive specimens are fond of such tender vegetables as lettuce and celery . . . Considerable warmth and absolutely dry quarters are the most important factors in keeping these reptiles in good health." I am sure the various *Handbooks* written by Albert H. Wright and Anna A. Wright (e.g., *Handbook of Snakes of the United States and* Canada; two volumes, the reprint costing almost one hundred dollars) contained similar husbandry hints, but I could never afford them as boy and I cannot find them now (see above). (Gentle Reader: Libraries keep books on the basis of how often they are circulated. As a result, many excellent, worthy titles are discarded on the dustbins of history, to be replaced by whatever is current, no matter how unproven the replacement is. Gentle Reader, if you find a book, no matter what the subject, that you enjoy, check it out of the library, even if you have no intention of rereading it. You'll be doing your part to retain a deserving title. End of sermon.)

At some point, I discovered Vinson Brown's *How to Make a Miniature Zoo.* A miniature zoo was exactly what I wanted my bedroom to become! The diagram opposite the title page illustrated "an inexpensive inside zoo" with tadpoles, a Horned Toad, a Fence Lizard, ants, termites, crickets, and mealworms. How could a loving mother refuse her son's request to establish such a splendid exhibit? Quite easily, I discovered. The fourth chapter deals with amphibians and reptiles, and gives very basic care advice, as well as describing two dozen or so species. Each species' description and needs occupy only one (short!) paragraph, but it was something to a boy starving for information! The caging advice is, by today's standards, shall we say, novel? The snake cage has a glass front, but wire screen sides, back, and top. A lizard cage is made out of a shoe box or corrugated cardboard box with a glass or celluloid front. Like many of the books from this era, a natural-looking terrarium or vivarium is suggested as the preferred cage.

A far more helpful book was *Our Small Native Animals: Their Habits and Care* by Roy Snedigar. The book came out in 1939, but I have the 1963 Dover reprint. Snedigar was the curator of reptiles at Brookfield Zoo, and reading his acknowledgments is like having a panoramic view of mid-twentieth-century herpetologists (at least to Baby Boomers). His position, though, explains the thoroughness of the coverage of herptiles. True, amphibians are treated in a single chapter, but lizards, turtles, snakes, and venomous snakes each get their own chapters! When I randomly opened my copy while writing this description, I opened it to a page describing the care of Ring-necked and DeKay's Snakes, two species more commonly seen than kept; his inclusion of these species shows the depth and breadth of help the book offers. His advice on caging, feeding, and other topics sounds reassuringly familiar to most of us today. And if someone wants to keep squirrels, raccoons, porcupines (I'm not sure if that's legal!), coyotes, and wildcats, well, Snedigar is your man!

Well, today it is a different world. Searching Amazon for "reptile pets" produced 2,600 suggestions (although I have to wonder about the algorithm when a book about tarantulas was the second title listed), while a web search came up with 23,000,000 hits (granted, the hits cover books, products, care sheets, etc.). All of this has come about, though, because 50 years or so ago a lot of girls and boys who were interested in amphibians and reptiles began keeping them, learning from their mistakes, and sharing what they learned. And gradually misconceptions ("Snakes ONLY eat live food"; "Turtles can live on dried ant pupas") were discredited and corrected. People wrote books; people learned when those books were accurate and when those books were misleading. And so today a 10-year-old boy or a 12-year-old girl (or vice versa: you get the idea) can sit down at a computer, search for "leopard gecko care," and have access to information that not only was hard to find 20 or 30 years ago, but may well have not existed. And that's good for the keeper and the kept (apologies to Carl Kauffeld).

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What You Missed at the April Meeting: Tony Colbert

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First let's talk about ReptileFest 2018. Hundreds of volunteers brought hundreds of animals to educate thousands of people about reptiles and amphibians. No animals were sold or traded. In the two days of the show over 6500 people purchased tickets and learned about the animals we are so involved with. Kids touched snakes and lizards. Adults held alligators and tortoises. It's billed as a family friendly event and it is, but for the reptile enthusiast there are animals they will not see in any zoo, museum, or aquarium in the Chicago area. There really is something for everyone. This year's attendance was the second highest in our over 20 years of presenting ReptileFest. Without our members and partner organizations we couldn't do what we do. And it's fun. Were you there? If not, will you be there next year? We'll remind you in time to save the date, and if you can't bring animals, you can help in other ways. And if you can't volunteer to help, please attend. The proceeds support the many smaller educational shows we do each year, the grants that we award for conservation and research, and the speakers we have each month. It's valuable work and you're part of it. Thanks.

Dr. Tony Colbert.

It's been a while since we've had a how-to talk. Who better to give one than a herp-obsessed vet who wanted to talk about the most common confusion he sees in his practice? Lighting—if you think you know everything you need to know about lighting and your animals, I think Dr. Tony Colbert made some points you might not have thought about. His bio from our website:

> Dr. Tony was born, raised, and educated in the Midwestern United States, graduating from Iowa State University College of Veterinary Medicine in 2013. He has traveled extensively during his education, pursuing preceptorships and externships in exotic animal medicine from experts in Australia and throughout the United States. While in veterinary school he was the President of both the Iowa State's Association of Reptile and Amphibian Veterinarians and Association of Avian Veterinarians clubs, heavily supplementing his own education and the education of others interested in exotic animals with hands-on exotic animal clinical experience, clinical reference materials and lectures from experienced exotic practitioners. Following graduation, Tony spent a year working as a crocodile veterinarian in the Philippines, dividing his time between two facilities on opposite ends of the county. In 2014 he returned to the US to practice exotic animal medicine in California for two years before returning to his home city to join Ness Exotic. Currently he shares his life with a ball python that he has had since age 17, a red-eared slider that has been in his family since he was 15, a Russian tortoise, a blue-tongued skink, and two cockatoos.

Tony divided his talk on lighting, covering some of the basics first and then delving into a more focused presentation of UVB. Using striking and informative slides, he covered the three important aspects of lighting, the tools to measure those, and the types of bulbs that can produce the suggested lighting. Tony reminded us that there are many different views on the husbandry of herps and that he's "just another guy expressing my thoughts on the matter" but he's obviously done much research and by his profession is exposed to many of the mistakes that can be made, so I suspect that his opinion holds a bit more weight than many.

The three aspects of lighting that one needs to consider are circadian rhythms, thermogradients, and light spectrums. Our animals are sensitive to the length of light and dark periods, and in many reptiles a well-developed pineal gland triggers a response to these changes. Many studies have demonstrated the impacts of photoperiods in a multitude of reptile behaviors. A timer on your lights will adequately achieve the desired photoperiod. A thermogradient is obviously important to an ectotherm and Tony suggested a range of 20 degrees. A temp gun can be used to spot check the enclosure. He reminded us that animals are closer to a heat source than the substrate and are getting more heat than is measured at the substrate surface. The light spectra most important to reptiles are infrared, visible light, UVA, and UVB. Generally, infrared provides the heat, visible light the photoperiod, and UV light important physiological needs, but some snakes can perceive infrared light through their facial pit organs and many reptiles have extremely good color vision and need UVA for accurate visual clues. UVB is incredibly important to calcium metabolism and homeostasis. A UV meter is necessary to measure UV light.

Tony followed with a summary of bulb types and their contribution to your reptiles' well-being. He stressed that you must learn your animals' needs and provide the proper lighting for that particular species. "Is this animal diurnal or nocturnal? What is the preferred temperature zone of the animal—does this animal hail from a tropical area or a temperate area? Does this animal require UVB lighting? Can this animal's requirements be achieved using a single light source? These general questions are incredibly important when it comes to the seemingly daunting task of selecting a bulb."

He started off with red bulbs that will produce heat but also have a visual component that should be considered. Incandescent bulbs are predominantly in the red-and-yellow range and complement the UVB bulbs that have little of that spectrum. They produce excellent heat and can be thermostatically controlled. Compact fluorescent bulbs usually contribute nothing to the thermogradient but put out high amounts of visible light and UVA, but UVB output is minimal and short lasting. They can be considered an excellent source of daytime light. UVB fluores-

cent tubes produce diffuse, low levels of UVB. They are suitable for non-basking species or for smaller enclosures where mercury vapor lights would provide too much heat. They usually produce good UVB at about 12 inches and need to be replaced every year. Mercury vapor lights may provide excellent infrared, visible light, UVA, and UVB, depending on the manufacturer. They produce high amounts of heat and may only be suitable for a larger cage. They cannot be thermostatically controlled. Tony cautioned us to carefully follow the manufacturers' instructions.

Tony then moved on to cover UVB in more detail. Referencing a *Reptiles Magazine* article by Dr. Francis Baines to which he provided a link, Tony covered the importance of UVB in the creation of vitamin D and that substance's role in many of the metabolic processes of our animals. He emphasized the importance of a UVB gradient and knowing the area coverage of particular bulbs. Compact fluorescents cover a very limited area but might be suitable for nocturnal species or small shade-dwelling species. Linear fluorescent bulbs can provide excellent large-area coverage but provide little heat and might be too intense for shade-loving animals. Mercury vapor bulbs provide good spot heat and UVB and are an excellent choice for basking animals such as bearded dragons and uromastyx. Metal halide bulbs produce a very small area of high intensity UVB so may be suitable for small, sun-loving animals such as day geckos.

Fortunately, over the last decade or so a team of researchers has measured UVB levels in various parts of the world and formulated what are known as Ferguson zones. They have assigned such zones to 254 species of reptile and amphibians and have given us the best chance of objectively knowing the UVB requirements of our animals. The link to this research that Tony provided in his talk is included at the end of this article. Tony had illustrations showing how combinations of different lights could be used to provide the most optimum habitat for our animals, but he did remind us that the sun is still the best full-spectrum illuminator. He reemphasized the importance of knowing and understanding your animals' needs and natural history.

Dr. Tony Colbert provided us with tools that can help us overcome the failures of our captive habitats. Through his obviously extensive studies and the experiences he's had in treating his patients, he prepared for us an overview of one of the more confusing aspects of reptile keeping. We're lucky to have him practicing in the Chicago area.

- Temp gun: <http://www.reptilebasics.com/TG-1>
- Arcadia fluorescent bulbs: <http://www.lightyourreptiles.com>
- More about reptile lighting: <http://www.uvguide.co.uk/aboutus.htm>

For the above-mentioned *Reptiles Magazine* article you can just Google "Baines Reptiles Magazine": <http://www.reptilesmagazine.com/An-In-Depth-Look-At-UV-Light-And-Its-Proper-Use-With-Reptiles/>

For the research on Ferguson zones: <http://www.jzar.org/jzar/article/view/150>

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Herpetological True Grit: Jumping Jack Splash

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A rare note of praise from my most ardent critic: "Great! This whole segment is well done . . . a good 'buddy story.'"
Dianna L. Repp, 1991

This author would like to thank those who endured my previous column in its entirety—both of you! Yeah, that was a long one—but it could have been *much* worse. Many pages were cut in the process of rewriting the capture of that first Sierra San Luis Ridgenose in the Barker study. First and foremost, the tale that is about to unfold in this issue of the Bulletin of the CHS *mercifully* fell by the wayside. Secondly, "Aww that next day" was also temporarily gutted. But for now, I'm taking you all back to 15 August 1986, to a place called Bear Canyon in the Sierra San Luis Mountains of Sonora, Mexico. On this day, we have two herpers barreling along a streambed, already more than two hours late for a preordained rendezvous with three people—who may have already left them for dead.

Urgency! Keep moving! Don't screw around—get thee both back to the vehicle, or risk the consequences of extreme tardiness with the keeper of the golden key. And *then*—right in the middle of the hell-bent-for-leather sprint to a ride out of the middle of nowhere—an 18-inch-long striped serpent was viewed lazily sprawled on top of a filthy, scum-infested tinaja. It was a Black-necked Gartersnake (*Thamnophis cyrtopsis*). One member of the tardy party of two sagely said "Screw it! We're late. We gotta *move*!" But the other member had more appreciation for the snake, and less for punctuality. This is our text. Let it be said, let it be done, let it be over. Amen.

The scum hole of a tinaja in which our quarry resided was roughly 8 feet wide by 12 feet long. The pool was so tainted by cattle disturbance that the depth could not immediately be ascertained. Later events proved it to be at least four feet deep in the middle, but we had no clue of that with the initial sighting of the snake. The stagnant little stink hole was not a true tinaja, in that the upstream end was encircled by bedrock, tinaja-style, while the downstream side was basically a flat, sandy beach.

The cattle were using the beach end to ingress and egress the pool, which they proceeded to foul and desecrate with all manner of bodily fluids. We tried to stealthily sneak up on the serpent, but the wary little spoil-sport detected our intent and dove from sight. Were it up to me, that would have been the end of this story. I would have just shrugged and moved on, leaving the score, Snake: One, Us: Zero. But there was no such word as fail to Jack Cover. This poor guy had been in the mountains for over a week, and the results of not finding much had him herpetologically shell-shocked. The fierce fire of pure, unadulterated herpetological passion burned in his eyes over this particular snake. He coveted it, he lusted after it, he *had* to catch it. He could not control his primeval urge to bag this snake. When I saw how determined he was to get this snake, I knew it was my duty to try to help.

And so, under the generalship of Jack, we took position on either side of the scum-infested stink hole to wait for the submerged snake to surface again. About five minutes later, the head of the little snake emerged, in periscope fashion, from its murky substrates. The cautious little thing had chosen a most strategic location to pop up. It was tucked under the overhang of the bedrock embankment, with a four foot tall mini-cliff above it. Its olive-green head was alertly poised above the surface of the slimy green waters, and its pink and black tongue wavered in and out, tasting the air for trouble. As luck would have it, the putrid little nothing-snake--whose best purpose would be as Kingsnake food-- had chosen my side of the bivouac to arise. (Why do they always come to my side of the bivouacs?) By the unwritten code of field herpetology, this made the snake mine to grab. After alerting Jack of my intent to catch our quarry, I sprawled out on my stomach, hooked my feet on a convenient exposed root, and hung the top half of my body downward over the face of the bedrock mini-cliff. I started to reach for the snake, but over-extended myself. As I started to fall into the dreadful waters below me, I made a clumsy grab that narrowly missed the snake. I stopped my fall by jamming both arms into the murky scum hole beyond my elbows, and had the pleasure of watching, at close range, the snake wiggle past me and dive for cover. I was now locked into some sort of precarious vertical push-up position, and my efforts to back out of it were proving futile.

"Er-uh, Jack, old buddy," came my hesitant request for help. "Do you think you could help me out a bit here?"

"Sure thing, buddy!" was Jack's response. "Nice catch, by the way."

"Yeah, yeah, never mind that. Just grab a handful and pull, wouldya? I can't believe I'm subjecting myself to this for a lousy gartersnake."

A very amused Jack Cover circled our little cesspool, grabbed my ankles with both hands, and with a mighty surge, hauled me out of trouble. After the proper amount of gratitude was displayed on my part, we resumed our positions to await the snake's next move. During the wait, I amused myself by watching both of my arms and hands take on an orange-to-yellow colored hue, the result of overexposure to the cattle urine in the water. Eventually, joy of joys, the snake's little head broke the surface of the cattle septic tank once again, in the exact place as before. And of course, as capture attempts go, was it Roger, or a rerun of Roger? Once again I was left locked up in a vertical push-up position, arms buried to above the elbows in the toxic waste waters of bovine bliss, watching the little snake slip underwater to safety within inches of my nose. Once Jack hauled me to safety once again, an extremely obsequious conversation occurred. The exchange was reminiscent of the two overly polite cartoon chipmunks, Chip and Dale. There was a whole of lot of "No, no I *insist*," and "after you" and more pleases and thank yous than every Miss Manners class that has ever convened.

"How would *you* like to give it a try?" I inquired of Jack after he had saved my bacon for the second time.

"Yes, please." Came Jack's response. "I would like that very much—but only if you don't mind?"

"Oh, no-no-no. I don't mind at all. Please be my guest. I *insist* that you have at it."

"Thank you. Well, then, if you *insist* that I try my hand, then it would be only proper for us to trade places."

"Oh, but of course. Let us do that."

"Yes, let's do."

As I circled the pool, I nearly tripped twice over the annoying tail that had suddenly grown between my legs. We each assumed our new positions, and the waiting game ensued. Presently, the little head of the gartersnake popped up, again in the same protective cove that had twice saved its miserable little hide. Jack was ready for it, and I had a great, unobscured front row view of what happened next.

A grim look of total determination crossed Jack's Nordic visage as he prepared himself for his lunge. He sprawled out, the top half of his body flung itself over the protective overhang, his right arm swept across his body and his hand clamped on the snake's midsection. He bent upward for long enough to raise his hand high, still grasping the snake, while looking straight at me. A look of fierce, Viking-warrior type of triumph flashed briefly through steely-blue eyes, giving way to an all out look of panic once the realization of what was going to happen next set in. He barely had time to utter "WHOA—*shit*!" before he tumbled headlong into the stagnant pus pool. The splash that followed was monumental, and the dark, greenish-brown waters engulfed him, swallowing him from sight. For several seconds, the only indication that there was a human being down in Davy Jones's locker were the fetid bubbles that rose to the surface. The water was so thick here that the bubbles did not burst, but remained intact. There was a kaleidoscope of every disgusting color in nature—the colors that were kicked out of rainbows eons ago—swirling about the perimeter of these bubbles.

Response to a crisis such as this is crucial, and I was less than equal to the task. My first aid for the situation was to throw back my head and laugh uproariously. So hard did I laugh that I lost my balance, and went to the ground. As I convulsed about, flat on my back, totally helpless, a hand was thrust above the surface of the pool. Clamped within that hand was the

gartersnake. I should have stopped laughing, stood erect, and saluted such a fantastic effort. That's what a *real* herper would have done. Instead of that, the hand out of the water grasping the snake only caused me to laugh all the harder. While I flopped about, I was laughing so hard now that both of my kidneys dislodged themselves from their moorings, and began to rise toward my throat. As this was happening, the hand was lowered back below the surface. Presently, Jack's head broke the surface, and as he shook his blonde head, slimy little green scum droplets were everywhere scattered. This was even funnier *yet*, but I could not possibly laugh any harder and live to tell about it.

"Would you please grab the snake?" Jack asked with an amazing degree of polite calmness. He was displaying some downright stoic resolve and dignity for a man who now had little rivulets of cow urine streaming down his face. While he was asking this small favor of me, I was also trying to talk to him.

"*You should have seen yourself*," I managed to gasp while trying to push my kidneys back in place. "That's the *funniest* thing I've ever seen! Har-har, first, you're like trying to—SNORT, trying to grab, BWA-HA-HA, grab the—SNICKER, trying to grab the s-s-s-s- AH HA HA . . . grab the snake, and then, like, GAAAA HA HA—KERSPLASH, har-har—***you shoulda seen yourself***!" BWA-HA-HA-HA . . .

"***Would you <u>please</u> grab the snake?***" Jack asked, his voice inflecting less politeness this time.

"Har-har, Har-har, er uh . . . eh? What's that you say?

"**The snake! Grab the snake! Grab the snake! JEEZ—*do I gotta draw you a picture?"***

"I *can't* grab the snake—you've got it!"

Poor Jack couldn't take the time to explain things any better to me, as he chose that moment in time to lose whatever precarious handhold he had on the bottom of his swimming hole. He slipped out of sight again, but soon after, the hand still grasping the writhing snake appeared somewhat closer to me. An epiphany suddenly took root in an otherwise dim and uncomprehending thinking process.

"O-h-h-h-h-h! I get it now!" I uttered as I snatched the snake from his grasp. "You want me to grab the snake! I got it now. Did I do good?"

I'm sure that Jack would have had a good comeback for this. But he was still floundering about in the muck under the surface of the stinky waterhole, and wasn't saying much. What I learned later was that the bottom of the cesspool was even slimier than the top, and poor Jack was having a hell of time trying to push himself up enough to get air. Eventually, his head broke the surface of the ooze for long enough to loudly utter "HELP!"

I switched the snake from my right hand to my left, and ran to Jack's side of the pool. As I did so, the snake—which had never drawn a tame breath in its life—latched on to my index finger and proceeded to slime me with musk up to my elbow. Things were getting pretty raunchy around Jack's swimming hole by this point. It was so bad that even the omnipresent flies couldn't stand it. They morphed into a myriad of little suicidal kamikazes that all began to crash land into the pool. At first I thought the audible little "plips" were raindrops falling from the sky. But a glance skyward revealed no clouds—just circling buzzards, which were having the devil of a time trying to stay aloft while flapping with but one wing, and covering their noses with the other.

I was eventually able to hook my fingers around the back of Jack's britches, and began to haul him out. This jerked his handhold out from under him, and the big guy went under again. Upon noticing that I wasn't helping matters any, Jack was inspired to abruptly request that I *stop* helping him. He was finally able to breast stroke his way to the sandy end of the pus pool, and sort of slithered his way out. There was a disgusting sucking noise as he pulled his feet out of the ooze, sounding not unlike a long and drawn out "schmuck."

The crises being over, I decided to laugh some more. Five solid minutes of laughter later—which Jack endured sheepishly—I managed to control myself for long enough to say "Great grab, buddy!" I detached the squirming, musk-slinging no-prize from my finger and gave it to the malodorous victor. Numerous comments were then issued between us, causing more laughter, and our friendship was sealed. The snake was bagged, and our rocket run downstream continued. My only remembrance of the ten-minute wind sprint that followed was that I went the distance behind Jack—where the air was less than pure.

Well, that ought to do it. My first impulse was to title this column "Much Ado about Nothing." But a literature search revealed that some obscure playwright from across the big pond had stolen that title from me over 400 years ago. Why do people always steal my good titles before I can use them? Why don't they give somebody else a chance? Of course, the usage of "True Grit" and "Jumping Jack Splash" in the title of this piece isn't exactly original. But then again, neither is "This here is Roger Repp, signing off from Southern Arizona, where the turtles are strong, the snakes are handsome, and the lizards are all above average."

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NEW CHS MEMBERS THIS MONTH

Scott Campbell
Jonathon Stasiek
Tom Jodelka
Ellie Evans

UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, May 30, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. The speaker will be **Rob Lovich**, herpetologist for the Department of Defense and Senior Natural Resource Specialist for the U.S. Navy in San Diego, California. Rob is co-author with Larry Jones of *Lizards of the American Southwest*.

The June 27 meeting will be our popular and always well-attended annual **Show & Tell** meeting. Bring an animal that you find interesting for one reason or another and be prepared to give a short (under five minutes) presentation to the group. Don't be shy. Neither age (yours) nor commonness (the animal's) should be a limitation.

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum—the **Peggy Notebaert Nature Museum**. This beautiful building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

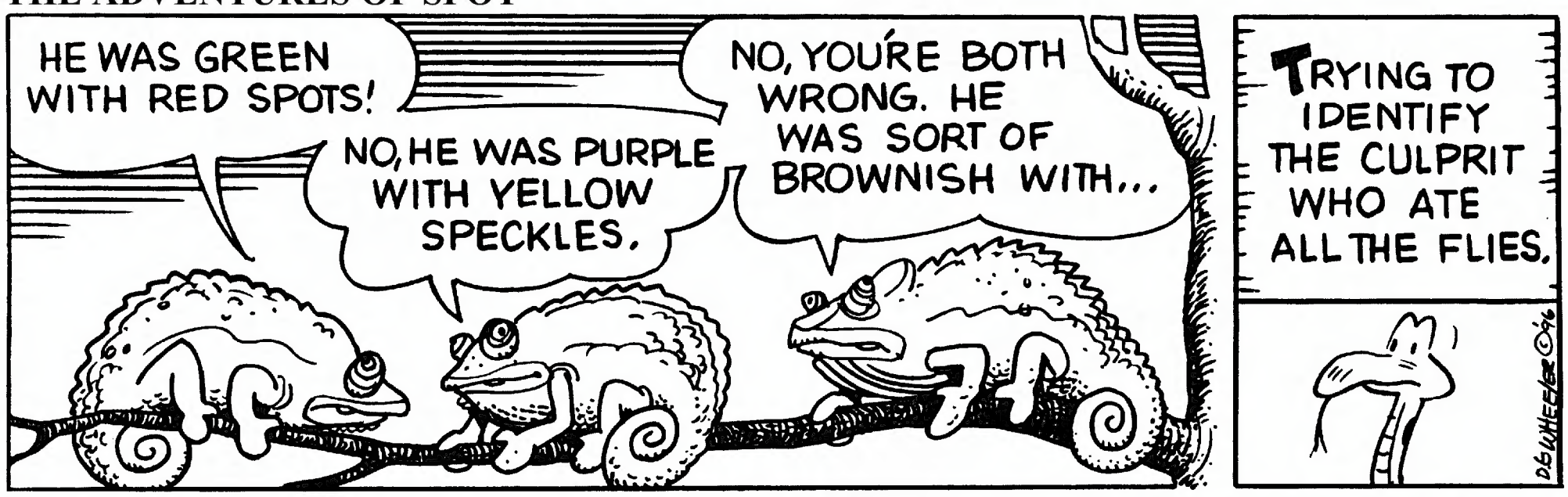
Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to take place on June 15, 2018. The venue is as yet uncertain, so if you wish to attend please email mdloogatch@chicagoherp.org.

The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the group's Facebook page.

THE ADVENTURES OF SPOT


HE WAS GREEN WITH RED SPOTS!
NO, HE WAS PURPLE WITH YELLOW SPECKLES.
NO, YOU'RE BOTH WRONG. HE WAS SORT OF BROWNISH WITH...
TRYING TO IDENTIFY THE CULPRIT WHO ATE ALL THE FLIES.
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